

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

April 27th, 1910.—Prof. W. W. Watts, Sc.D., M.Sc., F.R.S.,
President, in the Chair.

The following communications were read :—

1. 'On the Evolution of *Zaphrentis delanouei* in Lower Carboniferous Times.' By Robert George Carruthers, F.G.S.

The small simple corals that belong to the gens of *Zaphrentis delanouei* are of common occurrence in the Lower Carboniferous rocks of Scotland. Their distribution is remarkably sporadic, but it is possible to collect over wide areas of which the stratigraphy is definitely known. A large number of specimens have been got together (some twelve hundred in all), from horizons scattered throughout the sequence. The ontogeny of these specimens has been investigated by means of serial transverse sections.

The evolutionary changes observed are confined to the disposition of the septa, which has influenced the shape of the cardinal fossula in a very marked manner. The external characters, and the spacing and curvature of both septa and tabulæ, remain unchanged.

Zaphrentis delanouei is, typically, a Tournaisian species, and it has a wide fossula, expanded inwardly. When the gens first appears in the Scottish rocks (in the Cementstone Group of Liddesdale) *Z. delanouei* is the predominant form, but is associated with a mutation (in Waagen's sense) in which the fossula is parallel-sided.

In the higher limestones of Lawston Linn, another mutation appears, which, for reasons detailed in the paper, is regarded as a sport, or offshoot from the direct line of evolution.

In the succeeding Lower Limestone Group the gens undergoes further modification. Adults of the two Cementstone species are extremely rare, and the predominant form has a fossula which narrows rapidly to the inner end; in subordinate association a further mutation is also developed, in which the septa are short and amplexoid.

In the still higher horizons of the Upper Limestone Group, the last-mentioned mutation becomes predominant, and persists up to the Millstone Grit, where the septa become more amplexoid.

All these mutations, in neanic life, have characters seen in adults of the preceding form; tachygenesis is so marked that earlier ancestral traits are rarely seen.

Mutational percentages are given for many localities in the Carboniferous Limestone Series of the Central Valley, together with an analysis of the data so obtained.

Brief diagnoses of the four new species are appended to the paper, together with full locality-lists.

2. 'The Carboniferous Limestone South of the Craven Fault (Grassington-Hellfield District).' By Albert Wilmore, B.Sc., F.G.S.

As to the lithology of the beds, some are massive coarsely-stratified limestones, made up largely of crinoids, or corals, or shells (or mixtures of these); others are well-bedded, almost flaggy, black limestones made up of finely comminuted matter, with abundant foraminifera. There is every gradation between these extreme types. Variation in lithological character is lateral as well as vertical.

The strata are much disturbed everywhere. A series of folds strike roughly north-east and south-west, and are somewhat complex. There is considerable repetition of beds, and thickness is not so great as at first appears. This bears on the interesting question of the comparison of beds north and south of the Craven Fault.

The well-known knolls ('reef-knolls') are discussed. Their beds and those in the immediate neighbourhood are much disturbed. Irregular coarse bedding, folding, and normal long-continued weathering will explain most of their structural and other peculiarities. A typical knoll is dissected (Swinden); and it is seen to consist of folded, faulted, grey, coarsely-bedded limestone, with numerous great joints and much evidence of internal 'weathering.' Comparison of these knolls is drawn with the corresponding hills in the dark well-bedded limestones.

It is not easy to work out the exact zonal sequence, because of the disturbed character of the strata and the prevalence of glacial and fluvio-glacial drifts. The strata are apparently all Viséan (and the Author does not think that there is anything lower than Middle or Upper S).

In some beds, and under some circumstances, fossils are exceedingly plentiful and easily procured.

Some corals receive more especial notice, such as *Caninia gigantea*, Mich., which is distinctive of certain beds. Other species of *Caninia* are found. New or not well-known species of *Zaphrentis* are described. The Author briefly discusses the relationships of the genera *Caninia*, *Campophyllum*, *Calophyllum*, *Zaphrentis*, and *Amplexus*. New (?) species of *Lophophyllum* are also described, and the generic characters of *Lophophyllum* are discussed. There is a remarkably localized distribution of some corals, and *Syringopora* is very common in certain of the beds.

Suggestions are made as to the advisability of the disuse of some of the specific names. It is suggested that not more than four species of Carboniferous *Syringopora* need be retained.